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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - OCTOBER 1984

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Status of Publications

Published

MacDonald, Craig D., S.C. Jazwinski, and J.H. Prescott. 1984. Queuing behavior of the Hawaiian spiny lobster (Panulirus marginatus). Bull. Mar. Sci. 35:111-114.

MacFarlane, R. Bruce. 1984. Determination of corticosteroids in fish plasma by high performance liquid chromatography: Evaluation of the method using striped bass (Morone saxatilis).

A sensitive, specific, and reproducible technique for the simultaneous determination of cortisol, cortisone, and corticosterone in fish plasma was developed using high performance liquid chromatography (HPLC). Corticosteroids were extracted from plasma by methylene chloride and Sep-Pak cartridges for comparative purposes. The Sep-Pak method proved more convenient and efficient. Chromatography was accomplished on a nitrile bonded phase using a methanol-water mobile phase. Steroids were identified and quantified by monitoring absorbance at 254 and 280 nm simultaneously. Sensitivity is approximately 5 ng for each steroid. An evaluation of the technique using subadult striped bass (Morone saxatilis) revealed that cortisol was the only corticosteroid detected. Plasma cortisol concentrations increased in response to brief confinement and crowding, supporting the efficacy of this measurement as an evaluator of stress in striped bass. The HPLC technique provides specific determination of each corticosteroid (thus eliminating cross-reactivity problems inherent in radioimmunoassay methods), resolves corticosteroids from androgens and estrogens, and permits the isolation and purification of individual steroids. Can. J. Fish. Aquat. Sci. 41:1280-1286.

Methot, R.D. 1983. Seasonal variation in survival of larval northern anchovy, Engraulis mordax, estimated from the age distribution of juveniles. Fish. Bull. 81:741-750.

Juvenile northern anchovy, Engraulis mordax, collected during autumn of 1978 and 1979 were aged using daily increments in their otoliths. Neither year class was dominated by individuals born during some short period, but March and April had the highest frequency of births each year. Monthly ichthyoplankton surveys indicated that significant spawning occurred from January through May of each year and peaked in early March. Comparison of the temporal distribution of birth dates with larval abundance indicated that larval survival was similar in the first half of each spawning season and greater during April to May of the 1978 spawning season than the same period in 1979. This difference in seasonal pattern of survival was nearly sufficient to account for the observed greater recruitment in 1978 and is consistent

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

with the hypothesis that offshore transport of larvae influences recruitments.

Administrative Reports

Balazs, George H. History of sea turtles at Polihua Beach, northern Lanai. Southwest Fish. Cent. Admin. Rep. H-84-15.

A. Lono Lyman, Inc., and Hawaii Opinion, Inc. Economic and financial analysis of Hawaii's longline and handline fisheries. Southwest Fish. Cent. Admin. Rep. H-84-17C.

U.S. National Marine Fisheries Service. Annual and average monthly trends in the catch of bottom fish species in Hawaii 1949-80. Southwest Fish. Cent. Admin. Rep. H-84-16.

Approved by Center Director

Brill, Richard W. The standard metabolic rate of tunas: Effect of body size and acute temperature change. For consideration for publication in Physiological Zoology.

Gooding, Reginald M. Predation on released spiny lobster, Panulirus marginatus, during tests in the Northwestern Hawaiian Islands. For consideration for publication in Marine Fisheries Review.

Polovina, J.J. A variable catchability version of the Leslie model with application to an intensive fishing experiment on a multispecies stock. For consideration for publication in Fishery Bulletin, U.S.

Squires, Dale. Fishing effort: Its testing, specification, and internal structure in fisheries management and bioeconomic models. For consideration for publication in the Journal of Environmental Economics and Management.

Squires, Dale. Public regulation and the structure of production in multiproduct industries: An application to the New England otter trawl industry. For consideration for publication in the Rand Journal of Economics.

Ueber, Edward. Fillet yield of Dover sole. For consideration for publication in North American Journal Fisheries Management.

Wahlen, Bruce E. Incidental dolphin mortality in the eastern tropical Pacific tuna fishery, 1973 through 1978. For consideration for publication in Fishery Bulletin, U.S.

HONOLULU LABORATORY
Honolulu, Hawaii

Drift Bottle Found after Eleven Years

A drift bottle that was released near Christmas Island more than 11 years ago was recently recovered 4,600 miles due west on a beach on the northeast coast of Mindanao, a southern island in the Philippines. Cesar L. Cabrera found the bottle on June 15, 1983, and returned the identification card, which was inside the bottle, to the Honolulu Laboratory.

The bottle was one of 840 released a few miles north, east, and south of Christmas Island on February 4, 1973, as part of a study on the patterns of surface currents around oceanic islands. Christmas Island was selected because it was a single, small island that had no other intruding islands located upstream in the strong regular flow of the westerly North Equatorial Current. The bottles were tightly sealed, and weighted with sand so that they would be nearly immersed and not influenced by winds; the bottles also contained cards that were numbered for identification and provided space for the finder to fill in information on the date and location of the finding. One bottle was recovered at sea the following day after it was released--it had traveled around the north coast of the island and then west. Twelve bottles were recovered from the windward beach on Christmas Island on February 11 and 12, 1973. No other bottles had been found.

Although the time between release and recovery is over 10 years, Richard Shomura, Director, speculated that the bottle may have been lying undiscovered on the Mindanao beach for a number of years, especially if the beach where it was found is in a remote, relatively uninhabited part of Mindanao. Other drift experiments have shown that bottles released near the Equator in the central Pacific Ocean traveled at speeds of more than 35 miles a day, so it is possible that this bottle could have made the journey in about 128 days. However, it could also have been affected by local currents near islands, and thus it could have taken much longer than 128 days to reach the Philippines.

Insular Resources Investigation

Biogeography of Deepwater Fishes in the Marianas Described

As a result of an analysis of the biogeography of the deepwater snappers and groupers in the Mariana Archipelago, it appears that bank size, or more specifically the area of bottom fish habitat at a bank, may be the most important factor in determining the species diversity of the deepwater snapper and grouper community at an island or bank. The greater the area of bottom fish habitat, the greater the species diversity in the catch from the bank. An index of bank bottom fish habitat explains about 40% of the variation in the Shannon-Weaver index of diversity in the bank

catch composition. Cluster analysis indicates that based on catch composition all the banks are relatively invariant in catch profile over time and in the specific banks that make up each grouping. Differences in the catch profile and grouping of banks for at least two of the three clusters appear to be due to the bank area of the bottom fish habitat.

Secondly, within unfished portions of the archipelago, there was a general increase in the bottom fish catch rates with increasing latitude, whereas across the same latitude, seamounts had substantially higher catch rates than high islands. Not only do seamount features apparently support higher standing stocks, but it appears that for a number of species on the seamounts, the fish have a greater mean size and are heavier for their length than those at the high islands. Dr. Stephen Ralston, Fishery Biologist, determined the length-weight relationships of 23 of the most common species caught in the Mariana Archipelago during the RAIOMA survey. Regressions were computed for 5 serranids, 12 lutjanids, 2 lethrinids, 3 carangids, and 1 scombrid. Of these, 15 species demonstrated isometric growth over the range of lengths studied and 8 were allometric. Condition indices were also compared for populations of the most abundant species from three different geological areas. The results showed that individuals of Pristipomoides zonatus, P. auricilla, P. filamentosus, Caranx lugubris, and Selar crumenophthalmus from the seamounts of the West Mariana Ridge were significantly heavier for their length than were conspecifics from other localities.

Finally, for catch rates and species catch composition, variation among banks within a cruise period was considerably greater than variation among banks over the 2-year survey period.

New Research Program Developed

Dr. George W. Boehlert, Chief, Insular Resources Investigation, worked on the development of the structure and objectives for the new Fisheries Habitat Research Program. This program is being developed with newly appropriated funds to study potential threats to fisheries habitat, such as marine construction projects, manganese crust mining, and development of ocean thermal energy conversion (OTEC) projects. The goals of the program will be to define fisheries habitats and determine the effects of development and other activities of man on the habitat, which will also allow studies on habitat conservation, restoration, and mitigation for habitat loss.

Manuscript on Spiny Lobsters Completed

Reginald M. Gooding, Fishery Biologist, has submitted his manuscript, "Predation on released spiny lobster, Panulirus marginatus, during tests in the Northwestern Hawaiian Islands," to Marine Fisheries Review. In the Northwestern Hawaiian Islands fishery for spiny lobsters, undersized and berried lobsters must be released. Such lobsters released at the surface are vulnerable to predation by large carnivores. The paper presents the results of field tests which demonstrated that white ulua, Caranx

ignobilis, was an efficient and aggressive predator on released lobsters. Procedures are suggested to directly protect lobsters from predation by uluas during commercial trapping operations. However, the paper concludes that if the numbers of undersized lobsters caught by fishing vessels were significantly reduced by requiring that traps in the fishery be provided with escape gaps of specified dimension, the potential mortality from exposure and handling, as well as predation, might be so reduced that no measures to directly protect released lobsters need be considered.

Gooding also worked on a manuscript describing the effects of lobster offal (cephalothorax) on trap catches of spiny lobsters during experiments conducted in the Northwestern Hawaiian Islands. A total of 232 traps--109 control traps (baited only with fish) and 123 experimental traps (baited with fish plus two lobster heads in the trap or tied outside the trap)--were set on the banks at Necker Island, Maro Reef, and Pearl and Hermes Reef. The results showed that under the experimental conditions, the presence of lobster offal in the vicinity of traps did have a significant effect on the catch of lobsters. Of the total catch of 230 lobsters, 218 were caught in the control traps for a catch per unit of effort (lobster/trap-night) of 2.00, and 12 were caught in the experimental traps for a catch of 0.10.

Reef Fish Spawns Naturally at Kewalo Research Facility

Thomas K. Kazama, Fishery Biologist, reports that manini, Acanthurus sandvicensis, spawned naturally seven times in tanks at the Kewalo Research Facility. The larvae will be used for OTEC thermal shock studies. The fish spawned 2 to 5 days apart and between 1 and 2 hours before sunset. The fertilized ova averaged 0.66 mm and the single oil globule in the ova 0.15 mm in diameter. The ova hatched in 36 to 38 hours at 24 -25.5 C; at hatching the manini larvae were 1.96-2.13 mm in total length. Three species of algae, Chaetocerous gracilis, Tetraselmis suicica, and Isochrisis sp. were used singly or in combination with the rotifer, Brachionus plicatilis, and the copepod, Euterpina acutifrons, in rearing trials. All the larvae died by the fourth day, and only algae were found in their stomachs.

Fishery Management Research Program

Paper Presented at Meeting

Samuel G. Pooley, Industry Economist, participated in the annual meeting of the Western Association for the Valuation of Ecosystems at Avalon, California, where he presented an informal paper on the competition between large- and small-scale capital in Hawaii's commercial fisheries. The paper, "The hopelessness of the invisible hand: Open access fisheries in Hawaii," describes the entry of large-scale capital in the form of more highly mechanized fishing vessels into Hawaii's fishery. Problems of resource use and market competition are discussed within economies of scale. The paper suggests that forms of limited entry might provide the initial means for allocating resource and market shares in the commercial fishery. Pooley also presented a paper prepared by Dr. Karl Samples,

College of Tropical Agriculture, University of Hawaii, on the costs and benefits of fish aggregating devices.

Longline Fishing Data Analyzed

Gary L. Kamer, Statistician, worked on a new analysis of catch per unit of effort data from the Hawaiian and Japanese longline fisheries since there may have been a flaw in earlier analyses of these data because of seasonal trends. An exhaustive attempt was made to appropriately apply a SAS (a statistical software package) de-trending procedure developed for census data. Because additive and multiplicative models were not satisfactory, a de-trending SAS procedure that produces a 12-month centered average was used on quarterly data values. Monthly data were not usable because there were many missing values, which would invalidate the de-trending procedure. De-trending seems to have been effective because the results appear to be more similar to the original analysis of annual data, which is to be expected if seasonality is a serious problem.

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Pooley and research assistant Wesley K. Higuchi continued work on devising equations for their paper on the response of prices of fresh fish and, extrapolating the data received from the 1982 retail seafood survey. Demand and supply equations have been completed for the paper on fresh fish transactions. The supply of fresh fish is largely determined by the total number of fishing trips, and moderately determined by the week's fish price.

* * * * * * * * * * *

Research assistant Alan R. Everson completed a "Bottom fish ovary investigation prospectus" to aid in the analysis of uku, Aprion virescens, and onaga, Etelis coruscans, ovary samples. The research design comprises estimating size at first maturity, examining seasonality in fecundity, and assessing the total fecundity. The results of the analysis will be included in the bottom fish fishery management plan being prepared by the Western Pacific Regional Fishery Management Council.

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Ray F. Sumida, Fishery Biologist, reports that 16 vessels are currently licensed in the Northwestern Hawaiian Islands spiny lobster fishery. The fishery is composed of large vessels capable of fishing 500-

1,000 traps, and fishing effort is intense. Most of the product is destined for the frozen tails market.

Pelagic Resources Investigation

Further Attempts Made to Track Yellowfin Tuna

During the second week of October, Lt. (jg) Jeffrey A. Koch, NOAA Corps, Dr. Kim Holland, Hawaii Institute of Marine Biology, University of Hawaii, and research assistant Robert E. Bourke made another attempt to track yellowfin tuna, Thunnus albacares, using ultrasonic, depth-sensitive transmitters on the RV Kaahele'ale. During the first day of fishing, a Pacific blue marlin, Makaira nigricans, weighing approximately 102 kg (225 lb) was caught, tagged, and released. Several yellowfin tuna were also caught, but they were too small to be tagged with an ultrasonic transmitter. Because the Onan generator continued to overheat, further attempts to track yellowfin tuna were cancelled. Koch has completed repairs on the Onan generator including the replacement of the head gasket and portions of the exhaust system, and hoses in the seawater cooling system have been replaced with larger sizes. Also, an oil pressure gauge and an engine temperature gauge have been installed. These repairs should prevent the overheating problem that has plagued the generator and limited the use of the vessel the past year. Tracking attempts are scheduled to resume next week.

Tuna Swimming Depth Data Analyzed

Randolph K.C. Chang, Fishery Biologist, reports that he has completed plotting the data on the depth at which tuna swim from the tracking project. The plots show a fish's swimming depth every 10 seconds for continuous periods of up to 48 hours. Diurnal, hourly, and minute-to-minute rhythmic changes in swimming depth are readily apparent in these plots. Temperature-depth data obtained from XBT's are now being added to the plots to determine the effect of temperature on the swimming depth of yellowfin tuna and bigeye tuna, T. obesus.

Experiments on Physiology of Tunas Begin

Dr. Brill reports he is preparing equipment to begin a series of experiments on the effects of temperature on acid-base regulation and cardiovascular physiology of tunas. The Hewlett-Packard 9845 computer and its peripheral equipment, recently received from the La Jolla Laboratory, have been installed and will function as an automatic data collection system during these experiments. This series of experiments is part of a larger research effort to determine the effect of low ambient oxygen on the distribution, and gear vulnerability of tunas.

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Brill reports that he has been invited by Dr. Martin Rayner, Department Chairman, to become an affiliate faculty member of the Department of Physiology, John A. Burns School of Medicine, University of Hawaii, pending approval of the Department and the Board of Regents.

Draft of Workshop Proceedings Completed

Richard N. Uchida, Acting Chief, Pelagic Resources Investigation, reported that the first draft of the English version of, "Proceedings of the workshop on the environment and resources of seamounts in the North Pacific" was completed, and a copy sent to Dr. S. Hayasi and Dr. H. Yamanaka of the Far Seas Fisheries Research Laboratory, Shimizu, Japan, for their review. Uchida also reported that publication of the Japanese version of the workshop papers and abstracts was again delayed when the editors of the Bulletin of the Japanese Society of Fishery Oceanography requested that all the papers be shortened still further to comply with publication policy.

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Richard Uchida worked on a paper for presentation at the workshop on Fate and Impact of Marine Debris, and reviewed two Hawaii fisheries project proposals for funding in fiscal year 1985-86 with Saltonstall-Kennedy funds.

COASTAL FISHERIES RESOURCES DIVISION
La Jolla, California

Coastal Eastern Pacific Population Biology of Fishes

Biologist Gives Plankton Course in Mexico

Dr. Angeles Alvariño, Fishery Biologist, presented a plankton course and developed plankton research with the graduate and postgraduate biologists at the Interdisciplinary Center for Marine Sciences, La Paz, Baja California, Mexico, from September 22 to October 12, 1984. Alvariño also supervised work that several of her former students were conducting. During Alvariño's stay in La Paz, she presented daily seminars on physical and chemical oceanography, ocean dynamics, study of zooplankton groups, food, growth, reproduction, and many other topics.

Alvariño has also completed analyses of CALBOBL collection taken during the 8404 cruise. In this study, the abundance and distribution of Sagitta scrippsae, S. maxima, S. hexaptera, and S. enflata are being determined. Each plankton sample is completely analyzed, each specimen of S. scrippsae and S. maxima was measured, and the stage of sexual development determined. The stage and cycle of development of specimens of S. enflata are also determined.

Commercial and Recreational Fisheries Research for Management

Report in Preparation Summarizing "Household Production" Theory

Cynthia Thomson, Economist, is preparing a report summarizing recent developments in "household production" theory and how these results can be used in a recreational valuation context. She is also developing a model that can be used to value time spent in recreation. The general approach is to obtain a shadow price for time from a restricted cost function in which time appears as a fixed input. This is important because proper valuations of time are needed to obtain unbiased valuations of recreational activities. This theoretical work should be completed in November, and it will influence the design and implementation of the proposed economics survey of Bay-area saltwater angling.

Dr. Dan Huppert and Thomson met with Dr. Robert Rowe, Economist with Energy and Resource Consultants, Inc., of Boulder, Colorado, on October 9 and 10 to discuss revisions to the survey instrument designed by Rowe for the San Francisco Bay area study. An acceptable and pre-tested draft questionnaire form and preparation of a sampling plan should be completed during November so that the necessary requests can be sent to the Office of Management and Budget for approval.

Session Held on Groundfish Economics

Dr. Dan Huppert organized and chaired a special session on groundfish economics research projects at the 1984 Workshop of the Western Association for Valuation of Ecosystems at Avalon, Catalina Island, on October 3. The session was held to provide a forum for discussion of research issues, projects in progress, data bases available, and needs for the analysis of fisheries management. The effort was most successful in attracting a startling high number of people (14) concerned with groundfish economics--eight from NMFS, one from Oregon Department of Fish and Wildlife, one from the Pacific Fishery Management Council, and four from Universities. Coordination of research and data gathering should be improved as a result of this meeting, especially among the University and NMFS economists. Huppert has prepared and distributed a memo summarizing the individual research projects of the participants.

As a follow-up to the WAVE meeting, the SWFC and SWR economists met at Terminal Island on October 23 to make plans for completing the trawl budget simulator and cost analysis, to discuss extensions of the economic analysis for annual status reports, and to determine what data and/or analysis is needed to prepare for detailed evaluation of limited entry proposals. A thorough plan, including activities for each participating economist, was worked out for the budget simulator and cost analysis. In particular, the participants reached agreement on acquiring as much data as possible from the Capital Construction Fund program in Washington, DC, and combining these data with the existing trawl cost data file. The PACFIN landings data for the resulting "panel fleet" would be integrated, and additional important vessel characteristics (such as crew size) will be collected. Finally, logbook information on level of fishing activity ("effort"?) would be requested of the appropriate state agencies. The resulting data set will be adequate for rigorous and detailed analysis of fishing costs and strategies.

Pacific Mackerel Assessed

Drs. Alec MacCall and Richard Methot assisted Richard Klingbeil, California Department of Fish and Game, in estimating the biomass of the Pacific mackerel resource. The fishery is governed by a quota formula that allows a harvest of 20% of the biomass (age 1+) in excess of 20,000 short tons. The fishery is quickly approaching the quota set at the beginning of the season on July 1, and CDF&G wanted to reassess the biomass, given recent information collected by fishery monitoring. In order to obtain the most complete data base possible, estimates of the historical recreational catch (about 2,000 tons/year) and of the Mexican catch landed at Ensenada (about 4,000 tons/year) were included. Based on these three new sources of information, cohort analysis (also known as virtual population analysis) produced estimates somewhat larger than those obtained previously. As a result, CDF&G will be able to increase the Pacific mackerel quota for this 1984-85 fishing season.

Biologists Give Presentations at CalCOFI Conference

Richard Methot and Alec MacCall gave presentations at the CalCOFI Conference, which took place from October 29 to November 1, at Idyllwild, California. "Calibration of juvenile sampler" by Methot and Ken Mais was presented as a poster. The catch of anchovy by a 12' Isaacs-Kidd midwater trawl was compared with the catch of anchovy by a much larger pelagic trawl.

"Distribution of Dungeness crab larvae" by Methot, David Johnson, and Louis Botsford also was presented as a poster. The abundance of crab larvae in ichthyoplankton samples collected off the coasts of Washington and northern California was determined. Vertical and horizontal distributions were described.

"Recent abundance and productivity of Pacific mackerel" by Alec MacCall, Richard Klingbeil, and Richard Methot was presented as a paper. The age composition of mackerel landed by the fishery was analyzed by cohort analysis to determine recent changes in abundance. The observed pattern of variability in recruitment was used to assess the likely impact on the fishery of various harvest quota options.

Microcomputer Upgraded

Richard Methot has completed testing a new processor in a La Jolla Standard Microcomputer. The processor runs all 8-bit programs written for the CP/M-80 operating system, which is used on the La Jolla Standards. Program execution speed is doubled on the new processor because the Z-80 processor which executes the instructions, runs at twice the speed of the older Z-80s used in the La Jolla Standards. The new processor also has a 80286 processor, which runs 16-bit software written for the CP/M-86 operating system. A math co-processor (80287) linked to the 80286 greatly increases the speed and precision of computations. The new system is extremely easy to use. It automatically determines whether a program selected by the user should be run under 8-bit CP/M-80 or 16-bit CP/M-86. Data and text files created on a disk by one of the operating systems may be accessed by the other system without any extra steps required to be taken by the user.

A simple, but demanding, benchmark program demonstrates the gains in speed and accuracy made by the new system. The program was written in FORTRAN for CP/M-80 and CP/M-86:

CP/M-80, single precision, time = 9 min 16 sec; error = 10%
CP/M-86, single precision, time = 4.3 sec; error = 1%
CP/M-86, double precision, time = 4.3 sec; error = 0.0000000001%

Some of the gain is due to the new hardware and some is due to the new FORTRAN available for the CP/M-86 operating system.

OCEANIC FISHERIES RESOURCES DIVISION
La Jolla, California

Center Scientists Brief Commissioners

On October 1 and 10, Drs. Gary Sakagawa and Norman Bartoo presented an information briefing to United States advisors and commissioners who will take part in the November meeting of the International Commission for the Conservation of Atlantic Tunas. At the meeting, which was held in Washington, DC, Sakagawa and Bartoo reviewed the condition of the stocks of tropical tunas and discussed potential issues concerning the tropical tuna fisheries. The commissioners will use the information presented to formulate an official position for the November meeting of the Commission. Scientists from the Southeast Fisheries Center, Gloucester Laboratory, and the Washington, DC office also briefed the advisors and commissioners on other issues.

Tuna Assessment Investigations

Commercial Passenger Fishery for Albacore Reviewed

David Holts, Fishery Biologist, recently completed a review of the commercial passenger fishing vessel industry for Pacific albacore (Thunnus alalunga). In his review, Holts discusses the fishing vessels that are provided by the industry to recreational fishermen who want to fish offshore or in remote areas. These vessels include charterboats for hire by individuals or groups as well as partyboats with a first come, open seating policy. Both types of vessels normally go out for one- or two-day trips. Trips of three to five days are also common in southern California where the vessels are large and often very comfortable if not luxurious. On the average, over 20,000 angler trips per year are logged by west coast albacore anglers in the fishery; their catch represents about 2% of the U.S. commercial catch in the north Pacific.

The catch of Pacific albacore makes up a significant portion of the catch in the southern California sport fishery during the summer and fall months. Normally albacore begin moving into coastal Mexican and southern California waters in June, as the waters warm to 15-18 C, and catch rates peak in late July and August. Above Point Conception and north to Washington, albacore are present normally from mid-July through early September. The fishery in this area focuses more on Pacific salmon and less on albacore.

Catches of albacore in these areas (Figure 1) fluctuate considerably from year to year (Table 1), due to complex environmental factors that influence their availability to surface fisheries. One major environmental factor is the strength of coastal upwelling of cold, deep ocean water along the west coast of Oregon and Washington. Periods of strong upwelling appear to keep the albacore more offshore, which reduces their availability to the smaller, troll-type charterboats of that recreational fishery. Another environmental factor, El Nino, disrupts normal distribution and migratory paths of albacore and consequently influences their availability to the charterboat fishery throughout the west coast. This was particularly evident in 1959 when the fish did not move into southern California waters at all. More recently, catches in 1973 fell 90% from a five-year mean in excess of 100,000 fish to less than 10,000 fish. A 60% drop from the five-year mean was observed in 1983.

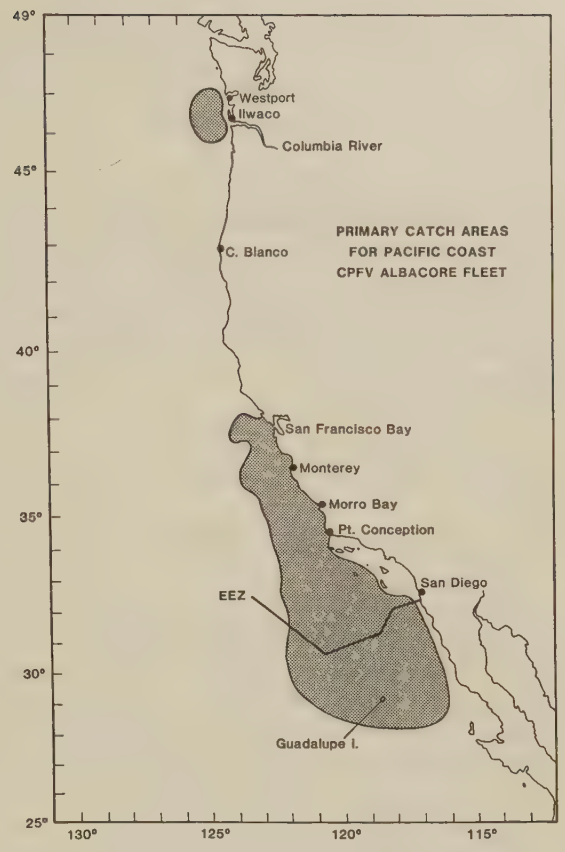

Figure 1. Principle areas of operation of the commercial passenger vessel fishing for albacore on the Pacific coast.

Table 1. Catch and catch-per-effort (catch/angler) by the commercial passenger fishery for albacore in various regions of the Pacific coast, 1936-1961 and 1973-1983.

			California									
			San Diego Point Conception		Point Conception Oregon border		Totals					
Year	Mexico No. fish	C/A	No. fish	C/A	No. fish	C/A	No. fish	C/A	Oregon No. fish	Washington No. fish	C/A
1936-1961	10,365	2.72	35,187	1.00	1,568	1.29	47,120	1.17			
1973	19		9,839				9,858			1,648	2.23
1974	3,850		8,964				12,814				
1975	68,296		13,266				81,562			5 494	3.40
1976	76,268		8,705				84,973			9,566	3.09
1977	62,678	1.65	6,504	1.58	1,092	0.66	70,274	1.60		4,275	1.77
1978	84,080		8,566				92,646			20,137	3.67
1979	7,260	1.50	1,021	0.61	1,915	1.01	10,196	1.21			
1980	15,657	1.36	1,290	1.93	4,362	1.08	21,309	1.32		1,540	3.08
1981	24,702	1.17	1,272	0.56	674	2.05	26,648	1.16			
1982*	28,862	1.26	5,071	1.12	1,214	2.04	35,147	1.26	35	18	
1983*	5,197	1.84	2,571	2.05	4,181	2.21	11,949	1.98			
5-yr av.	16,335	1.29	2,245	1.08	2,469	1.41	21,050	1.39			

*Preliminary

Fishing effort expended by recreational albacore anglers who are based in southern California and fishing in Mexican waters currently averages 12,700 angler trips annually, about 84% of total California effort. In contrast, records from 1936 to 1961 indicate that only about 10% of the California effort in this period was expended in Mexican waters.

Catch-per-unit effort shows regional differences resulting in part, from environmental conditions. Whenever albacore move within range of the Washington and Oregon charterboats, albacore trips are hurriedly scheduled to take advantage of the albacore. These charter vessels have experienced exceptional success and they average in excess of three fish per angler. However, this fishery is opportunistic and has not developed significantly in recent years.

Marine Mammal Assessment Investigations

Annual Tagging of California Sea Lions Completed

Scientists of the Marine Mammal Assessment Group recently completed the annual tagging of California sea lion pups on the offshore islands of San Nicolas, Santa Barbara, and San Clemente. This work, initiated at these islands in 1980, augments similar efforts being conducted at San Miguel Island by the National Marine Mammal Laboratory, Seattle, Washington. As a result of the two programs, all of the major southern California sea lion rookeries are sampled each year for data on the peak number of pups born. These data will be used to index the population growth within the Southern California Bight. Approximately one to two months after the peak pup counts, scientists capture, tag, and release a subsample of the pup population at each of the major rookeries. These efforts are directed at obtaining data on the movements of sea lions, age at sexual maturity, reproductive rates, and pup mortality.

The tagging method currently used involves either herding groups of pups together or capturing individuals with hoop nets. Once captured, each pup is weighed, sexed, and double tagged on the posterior edge of both foreflippers close to the body. The tags are Dalton riese tags, manufactured in England, and are made of a pliable plastic. Each tag is numbered on both sides and has the address of the Southwest Fisheries Center on the inside. Tag numbers are unique to the color series used to identify each island. This color scheme (red for San Nicolas, blue for Santa Barbara, and white for San Clemente) aids in identifying animal movement even if the tag number cannot be read. The tagging studies are allowed by a Marine Mammal Permit (No. 347), issued under the Marine Mammal Protection Act of 1972.

Brent Stewart, Hubbs-Sea World Research Institute, led the scientific party on San Nicolas Island during September 21-23, 1984. Members of the tagging party included Mark Lowry, Fishery Biologist at the SWFC, Pam Yochem and Steve Karl, Research Assistants, Hubbs-Sea World, and Tom Goff and Marilyn Dudley of the Sea World Animal Care department. A total of 257 sea lions were tagged, of which 250 were pups. The average pup weight was 30.83 pounds; males averaged 32.89 pounds and females averaged slightly lower at 28.42 pounds. The tag group worked at four separate areas on the southwest side of the island. Pups weighed at one area averaged about

three pounds more than those from the other three areas. In addition to the tagging work, Lowry also collected 56 scats from 3 of the areas for food habits analyses. The party also captured a female yearling sea lion, which had been tagged at Santa Barbara Island in 1983. Although this animal weighed only 40.5 pounds, it appeared to be in good condition.

During September 4-8, 1984, fishery biologist Sandy Hawes led a tagging team to Santa Barbara Island. The team consisted of Randall Rasmussen, SWFC, and Sheridon Stone, SWR, Sandy Diamond and John Scholl, CDF&G, and Terry Klinger, Scripps Institution of Oceanography. The group was transported to the island by the NOAA Ship David Starr Jordan and returned aboard the chartered boat Wildwave. Seventy-four pups were weighed and tagged: the pups weighed an average 38 pounds (range of 17 to 57 pounds). Males accounted for 55% of the pups captured and females 45%. As an indication of the general condition of the animals, 92% were rated good, 7% fair, and 1% poor. A total of 50 scats were also collected for food habits analyses.

During September 19-24, 1984, Biologists at the La Jolla Laboratory, Jeanne Wexler and Chuck Oliver, led a tagging team to San Clemente Island. The group consisted of Dave Holts and Sherri Hamer, SWFC, Dana Seagars, SWR, Mario Ghio, and Larry Buck. The group was joined at the island by Andy Yasko, Staff Civil Engineer, North Island Naval Air Station, and Lt. Donna Kline and Bob Woods of the Navy QUICKFIND group. One yearling female and 145 pups were tagged. The female weighed 78 pounds; the pups averaged 30.63 pounds with a sex ratio of 52% male and 48% female. The peak pup count obtained in late July at San Clemente was 411 pups, indicating that the tagging group was able to tag 35% of the peak count. The group noted open sores and lesions on the rear flippers and genital area of approximately 10% of the pups and the occurrence is being investigated.

Biological Systems Investigation

Meeting on Marine Mammal Salvage Program Held

Hannah Bernard, SWFC coordinator of the cooperative Marine Mammal Salvage Program (MMSP), held a meeting of active cooperators and data users of the salvage program at the SWFC on October 24. The program was established in San Diego county as a part of the statewide California Marine Mammal Stranding Network. The function, origins and cooperators of the MMSP were described in detail by Henderson and Hansen in SWFC Administrative Report LJ-83-07.

The purpose of the meeting was to inform participants of changes in the Stranding Network and re-establish contacts within the Network. Invited participants included Aleta Hohn, William Perrin, James Gilpatrick, and Gina Battista from the Oceanic Fisheries Resources Division, SWFC, and representatives from the NMFS Southwest Regional Office, NMFS Law Enforcement, Sea World Inc., California State Parks and Recreation, the Southern California Coastal Water Research Project and the Naval Ocean Systems Center.

The representatives were informed of personnel and notification changes in the MMSP at the SWFC. Notably, Hannah Bernard replaced Larry Hansen as San Diego county coordinator in October 1984. Bernard announced that the existing 24-hour hotline, which has been staffed by an answering service, will be discontinued and replaced with an answering machine that she will directly monitor on evenings and weekends. Bernard asked the agencies to assist in dissemination of the new phone number by distributing new posters provided by the Cousteau Society. The posters display the phone numbers of all Network participants in California. The wide dissemination of these posters will help ensure that strandings are properly reported.

An important objective of the meeting was to update collection and data needs of the participants. Bernard announced that all cetaceans are of interest to the SWFC for reproductive and taxonomic purposes and that the SWFC will continue to respond to calls involving stranded, dead cetaceans. Dead pinnipeds will not be retrieved, however, unless they were previously tagged. The participants and other groups also expressed an interest in continued specimen salvage for research and detailed their needs. Fresh cetacean tissue samples are wanted for mitochondrial DNA and pesticide contamination studies. Naval Ocean Systems Center requested the collection of whole brains.

In closing, Bernard distributed information describing the accomplishments of the California Network and, at the national level, the establishment of the Marine Mammal Events Program. The Program was funded through the Cousteau Society to compile reports of strandings nationwide, and is coordinated through the Smithsonian Institution. The new posters and copies of the current Stranding Network Directory were also distributed.

Mitochondrial DNA Workshop Held

The Marine Mammal Commission sponsored a workshop at the SWFC to discuss the use of sequence analysis of mitochondrial DNA (mtDNA) to resolve stock and species questions in marine mammals. The meeting, held October 30-31, brought together marine mammal collectors, veterinarians, curators, scientists, and administrators with researchers who use molecular techniques to study questions of relatedness and gene interchange between various marine mammal groups. The purpose of the meeting was to introduce the mtDNA techniques to the marine mammal community and describe what it can (and cannot) do to help clarify stock identification.

Dr. William Perrin, Senior Scientist, SWFC and Dr. G. Scott of the Southeast Fisheries Center began the meeting with a talk on geographical stock problems in dolphins. Perrin described the spinner, spotted, and common dolphin stocks in the eastern tropical Pacific and Scott discussed the various local bottlenose dolphin stocks off the southeast U.S. and Gulf coastline. Dr. D. Duffield, Portland State University, described her protein electrophoretic studies on those same bottlenose dolphin stocks.

The major portion of the workshop was taken up by Dr. Wes Brown, University of Michigan who gave a detailed tutorial on the mtDNA technique and its use in population studies. Dr. Andrew Dizon and Dr. Sarka Lucas,

SWFC, (editorial comment), described the progress they are making with spotted and spinner dolphin samples. Lucas also discussed her successful cloning of Commerson's dolphin mtDNA, the first time that any cetacean material has been cloned. That material will be used for making hybridization probes used in the analysis of samples collected on tuna boats, and is also available to any interested scientists. Dr. William Medway, University of Pennsylvania closed the first day's sessions with a discussion on sampling approaches and actual methods for obtaining tissues.

On the following day, the scientists performed the mtDNA analysis and met to discuss technical problems in the preparation and visualization of mtDNA.

Cephalorhynchus and Delphinus Compared

Dr. Sarka Lucas has mapped the restriction endonuclease digestion sites of mitochondrial DNA (mtDNA) that had been purified by oceanographer John Graves from frozen liver samples of the common dolphin (Delphinus delphus) and the Commerson's dolphin (Cephalorhynchus commersonii). The mtDNAs of these two delphinid species demonstrate considerable nucleotide sequence divergence. The recently purified Delphinus mtDNA is currently being cloned and will be used with the Cephalorhynchus mtDNA (which has already been cloned) to probe southern blots of Stenella species for intraspecific genetic investigations.

Paralabrax mtDNA Investigated

Dr. John Graves reports that an mtDNA analysis of three local bass species of the genus Paralabrax has demonstrated a striking amount of mtDNA nucleotide sequence divergence between the species. The data indicate that the kelp bass (P. clathratus) is quite distinct from the barred and spotted sand basses (P. nebulifer and P. maculofasciatus), which are more closely related to each other. These results agree with those of a recent, extensive electrophoretic study (42 loci) of the three species. It is important to note that, although only a few of the 42 electrophoretic loci could distinguish the three species, almost one-half of the 16 restriction enzymes were able to do so. The results of this interspecific comparison of marine species will be used as a reference for intraspecific investigations of various scombrid species.

Collaborative Project Begun to Calibrate Killer Whale Teeth

Pamela Yochem, Hubbs-Sea World Research Institute, and Dr. Albert Myrick, Leader of the Marine Mammal Age Determination Project, are working on a project to calibrate layers in the teeth from a small sample of killer whales for which captive histories are available. Myrick is currently training Yochem to prepare the teeth for the study. The tooth sample represents 11 tetracycline-labeled specimens of various ages and both sexes. One of the animals represented had been labeled numerous times during the ten years it was in captivity and is of known age. Labeled teeth from additional specimens may become available during the course of the study and may be included later to increase the study sample.

After preparing the sample, Yochem and Myrick will study the specimens microscopically with ultra violet light to locate tetracycline labels with plain light to examine the layers of dentine. Using medical records, the two researchers plan to identify the introduction times of each label and, by photographs and maps of the labels and dentinal patterns, to determine the time represented by the layers between the labels. Finally, annual or sub-annual layering patterns will be characterized so that a typical annual growth layer group may be defined for killer whales. Yochem and Myrick hope that in addition to developing an age estimating tool for killer whales, the results of this short study can be used to test assumptions used in age estimating techniques for delphinids in general.

Multispecies Data Management and Fisheries Monitoring Program

Status of Puerto Rico Biological Sampling Program

Foreign-caught Atlantic tunas transshipped to Mayaquez, Puerto Rico, continue to be sampled for length, weight, and species composition by biological technician Eugene Holzapfel. Results of the sampling during the period January 1, 1984, through October 31, 1984, are as follows:

Species	Gear	Samples	Number Sampled
Yellowfin	Baitboat	12	912
	Purse seine	10	667
	Unknown	4	271
Skipjack	Baitboat	11	410
	Purse seine	2	101
	Longline	1	30
	Unknown	1	50
Bigeye	Baitboat	6	207
	Purse seine	8	319
	Unknown	2	111

The number of samples taken thus far this year, compared with the number of samples taken during the same period in 1983, is down 54% for yellowfin tuna, and 19% for both bigeye and skipjack tunas. Holzapfel reports that this is due to the below normal number of Atlantic imports during the first part of 1984. He also reports that imports seem to be returning to normal levels during the later part of 1984.

Status of 1984 Tuna/Dolphin Observer Data

Biological technician Al Jackson reports that four tuna/dolphin observers (three collecting data for the NMFS and one collecting

information for the Inter-American Tropical Tuna Commission) departed in October on cruises aboard commercial tuna seiners fishing in the eastern tropical Pacific. Currently, four NMFS observers and five IATTC observers are at sea.

Set log and tally data for three cruises were added to the 1984 tuna/dolphin data bases this month. These data include the structure and cause of the dolphin mortality incidental to the fishery, gear deployment, effectiveness of dolphin release methods, and observations pertaining to U.S. Marine Mammal Regulations. The 1984 set log and tally data bases now have data from five cruises and contain 193 total purse seine sets including 164 sets on dolphins. The status of NMFS tuna/dolphin observer data collected this year to date is:

Cruise Number	Vessel Depart	Vessel Return	Data Received	Data Edited	Database Loaded
884	4-29-84	6-13-84	6-22-84	7-31-84	9-24-84
887	5-09-84	7-28-84	8-13-84	*	*
888	5-10-84	7-23-84	8-08-84	*	*
889	5-10-84	6-25-84	7-06-84	7-27-84	9-24-84
890	6-04-84	8-22-84	8-31-84	*	*
891	6-26-84	10-19-84	10-19-84		
892	8-03-84	9-19-84	9-28-84		
899	9-22-84				
900	10-16-84				
901	10-23-84				
902	10-25-84				
Total 11	11	7	7	2	2

*Only set log and tally data bases have been loaded.

1983 Bridge Log Data Base Updated

The 1983 bridge log data have been edited and loaded onto the data base. These data are collected by tuna seiner fish captains who possess certificates of inclusion permitting them to set their nets on fish associated with dolphins. The data include time and date, position, dolphin school size, incidental dolphin mortality and injury, and fish loaded for each dolphin set. The 1983 bridge log data base has data collected on 50 fishing trips and contains 1,445 sets on dolphins.

PACIFIC ENVIRONMENTAL GROUP
Monterey, California

Symposium Convened on Comparative Studies of Eastern Ocean Boundary Systems

Andrew Bakun, Chief of the Pacific Environmental Group, convened the theme symposium "Comparative Studies of Eastern Ocean Boundary Systems" at the annual meeting of the California Cooperative Oceanic Fisheries Investigations at Idyllwild, California, October 29-November 8, 1984.

The four major eastern-ocean boundary regions of the world--the California, Peru, Canary, and Benguela Current regions--contain similar complexes of pelagic fishery species and appear to be governed by similar environmental dynamics. In each of the regions, there are dominant anchovy, sardine, mackerel, jack mackerel, hake, and bonito species. In some cases the very same species inhabit more than one of the regions; in all cases the corresponding species are nearly identical in appearance and function. The pelagic fisheries of these regions have also exhibited similar histories of rapid fishery growth and episodes of abrupt decline.

Comparative studies of these eastern boundary systems are considered a promising approach to the difficult and important problem of recruitment variability. For example, since natural selection implies that reproductive strategies reflect responses to the most crucial factors regulating reproductive success, compelling patterns of correspondence among reproductive habits and environmental characteristics are likely to reveal the important causal mechanisms.

The first paper of the session, "Comparative Studies and the Recruitment Problem: Searching for Generalizations" was presented by Bakun. In it he developed the rationale for application of the comparative method to recruitment research, detailed some recent successful efforts, and made some recommendations as to future approaches deemed to be particularly promising.

The second paper, presented by Joël Picaut of the Universite de Bretagne Occidentale in Brest, France, was entitled, "Major Dynamics Affecting the Eastern Equatorial Atlantic and Pacific Oceans." Picaut presented a synthesis of recent results concerning local and remote forcing of seasonal and interannual variability in the eastern parts of these two oceans. One result, which was of particular interest to the participants, was that during the propagation of major anomalies such as "El Nino" evidence at depth may substantially precede that at the surface; this may be one reason why biological evidence sometimes precedes physical evidence at the surface (i.e., organisms associated with conditions at depth may use their vertical mobility to make their appearance at the surface).

The third paper was by PEG scientists Doug McLain, Jerry Norton, Rusty Brainard, and Dave Husby. The paper, "Anomalous Warm Years in Eastern Boundary Current Systems," documented recent "El Niño"-type occurrences in

both the eastern Pacific and Atlantic Oceans. A major warm event occurred off Southwest Africa last year, one year after the 1982-83 Pacific El Niño.

Richard T. Barber and J.E. Kogelschatz of Duke University presented a "Comparative Analysis of the Coastal Upwelling Ecosystems of the Canary, Benguela, and Peru Current Systems," and Richard Dugdale of USC spoke on, "The Effects of Varying Nutrient Concentrations on Biological Production in Upwelling Regions." In a paper entitled "The Benguela--Beyond the One Degree Square," Peter Shelton of the Sea Fisheries Research Institute in Capetown described the spawning habitats of sardines and anchovies off Namibia and South Africa.

The focus switched from the environments to the fishes themselves in "A Comparison of the Population Biology of Eastern Boundary Current Sardines," co-authored by Dick Parrish of PEG and Rodolfo Serra of the Chilean Subsecretaria de Pesca. The final symposium paper, by Paul Smith and Roger Hewitt of the Center's Coastal Division, discussed, "Anchovy Egg and Larval Dispersal and Mortality as inferred from Close Interval Observations."

The symposium papers will be published as a group in the next volume of CalCOFI Reports and are expected to be a valuable resource to researchers involved in application of the comparative method to the fishery problems of these regions.

TIBURON LABORATORY
Tiburon, California

Groundfish Research Expanded

Norman Abramson, Director of the Tiburon Laboratory, was appointed Groundfish Research Coordinator for the Southwest Fisheries Center by Center Director Dr. Izadore Barrett, and groundfish research at the Laboratory has been expanded. The Groundfish Analaysis Task has been elevated to the investigation level under the leadership of Dr. William Lenarz, and its budget and personnel increased. Industrial economist Ed Ueber has been transferred to the Task from the Underutilized Fishery Resource Investigation. New studies include economic analyses of groundfish fisheries and the development of a sampling plan for sablefish. Much of the effort of the staff of the Physiological Ecology Investigation will be directed toward groundfish and a new task, Physiological Ecology of Pacific Coast Groundfish, has been created under the leadership of Dr. Jeannette Whipple.

Groundfish Analysis Investigation

Rockfish Age Determination Training Sessions Held

Tina Echeverria, Fishery Biologist with the Groundfish Analysis Investigation, held training sessions in age determination techniques this month. Biological technician Brian Jarvis and biological aid Dave Woodbury were taught the "break-and-burn" as well as the "surface-aging" method for Sebastes flavidus and Sebastes entomelas. They are responsible for age determinations of the 1984 samples from the California Cooperative Rockfish Survey.

Groundfish Management Team Prepares Status of Groundfish Fishery Report

Dr. William Lenarz, Leader of the Groundfish Analysis Investigation, recently participated in two meetings of the Groundfish Management Team of the Pacific Fishery Management Council. At the meetings in Seattle and Portland, Lenarz presented his analysis of the status of the widow rockfish fishery. His analysis incorporated a more sophisticated dynamic pool model than those of previous analyses and allows better projections of future states of the stock. The team reviewed and accepted the analysis as the basis for its recommendations on management of the fishery in 1985. Lenarz participated in reviews of the status of all other important species managed under the Groundfish Management Plan. He and other members of the team developed options for maintaining a year-round fishery for groundfish in 1985. The Team's report on the status of the groundfish fishery will be presented to the Council at its November meeting in Seattle.

Physiological Ecology Investigation

Daily Growth Ring Formation in Striped Bass Larvae Studied

Analysis of data that had been collected during the Tiburon Laboratory's studies of the bioenergetics of early life stages of striped bass indicated that larvae of approximately 9-12 mm standard length (or ages 3 to 4 weeks after hatching) would potentially suffer high mortalities in the wild if high concentrations of suitable microzooplankton prey were not available. To test this hypothesis, it was necessary to age wild larvae to determine if growth and development were normal for a given set of habitat conditions. Fishery biologist Mickey Eldridge and California Department of Fish and Game Biologist Lee Miller conducted field and laboratory studies to determine daily otolith growth ring formation because no means of determining ages of these small larvae were available. Striped bass were reared in the laboratory while cohorts were cultured at the California DFG hatchery at Elk Grove, California. At the same time wild larvae were collected from the San Francisco Bay/Delta estuary.

Examination of laboratory specimens indicates that the first growth ring was formed at hatching, and subsequent rings formed daily up to the time of metamorphosis. Otolith size (diameter) also increased with age and standard length in a linear fashion. The absence of exogenous food affected the growth of both otoliths and ring formation in starved specimens. No significant otolith growth occurred in starved larvae beyond the fifth day after hatching. In starved animals, the number of rings was variable and difficult to determine beyond approximately 2 weeks after hatching. In animals that were initially starved for 3 weeks and then fed, newly formed outer rings were visible, which provided evidence of available food rations. Analyses of otoliths of wild and hatchery fish have yet to be completed. Preliminary examination seems to indicate, however, that fish were significantly smaller for their indicated ages than larvae of the same age reared in the laboratory. If this holds true for the entire data base, there would be strong evidence that wild striped bass larvae were not developing at normal rates. Factors such as critical foods at first feeding might become significant in helping explain why striped bass populations are declining in California and in the northeastern United States.

Another aspect of the laboratory experiments was the determination of the shrinkage due to formaldehyde preservation. Standard length, body depth at the anus, and head length were measured on live, anesthetized larvae, which were then preserved and remeasured approximately 3 months

later. Regression analyses of the morphometrics are presented in the following table. Shrinkage was found to be approximately 6, 7, and 25% for the three measurements. The reason for the high degree of shrinkage in the head length has yet to be determined.

Measurement	Treatments: Live	Preserved
Standard length (mm) vs Age (days post-hatch)	$Y=4.68+0.2227X$, $r^2=.97$	$Y=4.13+0.2164X$, $r^2=.97$
Depth at Anus vs Age	$Y=0.27+0.0601X$, $r^2=.97$	$Y=0.26=0.0588X$, $r^2=.95$
Head length	$Y=0.66+0.0872X$, $r^2=.98$	$Y=0.36=0.0907X$, $r^2=.98$

Underutilized Fisheries Investigation

Pelagic Red Crab Fishcake Makes Debut

Pelagic red crabs, usually found only off southern California in warm-water years, are still abundant at the northern Channel Islands. El Niño conditions brought the crabs from Mexico in 1982 and they seem to have reproduced successfully in southern California. A close relative, the Chilean langostino, is used for human consumption, although the California species is too small for use in the same manner (cooked and peeled tails).

Several years ago, biologists at the Tiburon Laboratory developed a fishery for pelagic red crabs for use as an aquaculture feed ingredient. Food technologists at the Northwest and Alaska Fisheries Center discovered that the crabs were an excellent source of carotenoid pigments, which are necessary in the diet of salmon to attain their characteristic flesh color. A southern California fisherman fished red crabs off Baja California for 4 years until Mexico proclaimed its 200-mile fisheries jurisdiction.

During a short charter cruise this summer on a commercial trawler, biologists Sus Kato and Sennen Salapare caught 10,000 pounds of red crabs in a 15-minute tow near Santa Cruz Island, which is off Santa Barbara. Most of the crabs were released alive. About 200 pounds were returnedand later ground up whole and then frozen. A small sample was turned over to Yamasa Enterprises, a fishcake manufacturer in Los Angeles. Ten pounds of red crabs were mixed with 40 pounds of Alaska pollock surimi (a minced fish product) and a small amount of starch and salt. The resulting mixture was an orange paste similar in consistency to some traditional Japanese fishcake products. The red crab fishcake was formed into small balls, deep-fried, and served at a conference sponsored by the American Institute of Wine and Food. The participants at the conference, which was held October 21 at Santa Barbara, included restaurateurs, cookbook writers, food and wine connoisseurs, critics, and suppliers. Nearly all of the 50 to 60 persons who tasted the red crab fishcake liked it; several persons returned for second helpings, while the others asked for recipes or where they could buy it. The results were very gratifying because the fishcake was competing with dishes prepared by famous chefs--Lobster Santa Barbara with Pasta, English Sole with Salmon Mousse and Basil Sauce, Cream of Sea Urchin Roe Soup. The chief speaker was the Honorable Alan Davidson, a well-known cookbook writer and publisher and former British diplomat. The topic of the main symposium, moderated by Robert Huttenback, Chancellor of UC Santa Barbara, was "The Future of Our Seafood Supply." Sus Kato of the Tiburon Laboratory spoke about a number of underutilized species available from the Santa Barbara area, Bob Price of Sea Grant, UC Davis, talked about the maintenance of quality in seafood products, and Bob McVey, Sea Grant Washington, DC, discussed the role of aquaculture in the future. Fishing industry members and cooks on the panel reiterated the necessity--and the difficulty--of introducing new species in seafood markets and in restaurants.

FISHERIES INFORMATION SYSTEMS & ADP

CALFIN and PACFIN Updated

Computer specialist Jerry Hornoff, stationed at the SW Region, is in the process of implementing the Marine Mammal Stranding Network. The Marine Mammal Stranding Network is an information system for the Protected Species and Habitat Conservation Branch at the Southwest Regional Office. Part of the network's data resides on Information Consultants, Inc. (ICI) DEC-20 system located in Washington, DC.

All occurrences of marine mammal strandings within the state of California will be documented through the software. The database contains information regarding the date, location, species, and morphometrics of marine mammal strandings in 1983-1984. When data entry is completed the database will contain approximately 3,000 strandings for this time period and analysis of the data will begin. Eventually this database will contain data starting in 1981 and proceeding through the current year.

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During September and October, the Southwest Regional Office has been expanding into the area of computer graphics. At the mainframe level, the staff at the Region has increased usage of ISSCO Graphics Sofftware, which is available on the ICI DEC-20 system. The ISSCO Graphics Software system contains three levels. At the base is the software package DISSPLA; this is the library of callable subroutines controlling pen or cursor movements on a variety of output devices. The intermediate package is TELLAGRAF; this allows a user to interactively construct a graph using a library of commands. The top level package is CUECHART; this is a menu-driven system that allows a user to construct either a line graph, bar chart or pie chart. For output devices, the Region uses either a Tektronix 4025 graphics terminal or a Tektronix 4682 plotter. Both of these devices are located at the Regional Office and therefore allow rapid turnaround on all graphics tasks.

Work on Updating WPACFIN Continues

David C. Hamm, Computer Systems Analyst, visited the American Samoa Office of Marine Resources to work with the staff to establish vessel inventory and tournament data bases, improve several other existing data bases, and establish some of the criteria for developing an automated data expansion system. Hamm also installed new hardware and provided additional training for the staff on the use of several software packages.

Hamm also reports that development of the central Western Pacific Fishery Information Network data bases and processing systems on the Honolulu Laboratory Molecular computer continued. The dBase II Guam Commercial Landings System was modified and a first draft user's guide for

the system developed. The system is the first of several "user friendly" data summarizing and reporting systems planned for implementation in fiscal year 1985.

The Guam Offshore Expansion System has been implemented by the Guam Division of Aquatic and Wildlife Resources and expansions have been made on monthly creel survey data for about the past 5 years. Todd T. Kassman, Computer Programmer, completed the second draft of the user's guide and the first draft of the programmer's guide.

Status of Noted the Molecular Supermicro 32X

Peter Winokur, System Specialist with Digital Source, Inc. (DSI), fulfilled his contract to bring the La Jolla Laboratory Molecular 32X up to a functioning system with the Cipher tape drive. DSI will be granted a contract to maintain the hardware for both the La Jolla 32X and the shipboard Molecular 15-8 systems. The contract will also include 6 hours per month of software maintenance.

Fred Kellenberger, Data Systems Manager, Jack Brown, Electronics Engineer, Susan Iacometti, Systems Programmer, Rob Bistodeau, Programmer Analyst, and Dorothy Roll, Systems Analyst, met to discuss the division of responsibilities for the La Jolla 32X, shipboard 15-8 and the implementation of the wordprocessing network on the 32X. Bistodeau will manage the users on the system and will be responsible for the software installation.

The networking on the La Jolla 32X for the wordprocessing system is progressing at a satisfactory rate. Lines to link the Director's office, the Technical Support Group, and the secretarial staff for OFRD and CFRD have been installed.

ADMINISTRATIVE ACTIVITIES

Information of Status of A-76 Updated

The Southwest Fisheries Center received the final Arthur Young Management Efficiency Study on September 24, 1984. During October, the study has been under review by the Center. This final study does not include any changes from the second version, which was received on June 27. On October 30, 1984, the Center forwarded comments and recommendations to Dr. Angelovic, F/S, for his consideration. These comments and recommendations would also ultimately be included in a NMFS recommendation to James Winchester, Associate Administrator of NOAA. It is expected that the NMFS review will be completed during November. This study is now about 30 weeks behind schedule--based on the previously approved A-76 implementation schedule for the SWFC.

MISCELLANEOUS

Public Affairs

Honolulu Laboratory

October 5 - Dr. George W. Boehlert presented a seminar at the Department of Zoology, University of Hawaii, on reproductive modes and embryonic energetics in Sebastes.

La Jolla Laboratory

October 9 - Michael Laurs gave a lecture on Careers in Oceanography to a class of 45 students at Torrey Pines High School in Del Mar, California.

Pacific Environmental Group

October 19 - Paul Sund gave a talk on careers in marine science at Seaside High School, speaking to juniors and seniors in two biology classes.

Tiburon Laboratory

October 23 - Oceanographer Bruce MacFarlane and fishery biologist Mickey Eldridge took part in a special KCBS broadcast on the status of San Francisco Bay in relation to the changes in water flows and diversions and the discharges of pollutants. Emphasis was given to the effects of those changes on the aquatic organisms of the estuary.

26 - Pete Adams spoke on marine biology as a profession to students at Saint Francis Middle School in Sonoma on Career Day.

Press Releases

Honolulu Laboratory

October 29 - "Drift Bottle Makes Long Journey."

Visitors

Honolulu Laboratory

October 19 - Dr. Phil Lobel, Woods Hole Oceanographic Institution, visited Dr. Boehlert to discuss results of sampling and oceanographic work at Johnston Atoll.

23 - Kitty Simonds and Paul Bartram of the Council met with Richard Shomura to review the Council's research needs.

24 - Bob Agres of Maui County visited Richard Shomura to discuss the Maui baitfish project.

29 - Dr. Lamarr Trott, Senior Fisheries Advisor, Office of Agriculture, Bureau for Science and Technology, AID, Washington, DC, visited Richard Shomura to discuss AID's new project on reproductive studies of milkfish at the Oceanic Institute, Hawaii.

La Jolla Laboratory

October 3 - Clive Palmer and Ken Dolan, New Zealand Consulate, met with John Carr.

9 - Saad Tazi, Director of Maritime Fisheries, Morocco, visited Izadore Barrett.

9-10 - Dr. R. Rowe, Energy and Resources Consultants, Inc., met with Dan Huppert, Sam Herrick, and Cynthia Thomson.

25 - Dr. Kilho Park, National Ocean Service, Washington, DC, visited the Center.

26 - Sandra Bozworth, President's Committee to Review Centralized Administrative Activities, Washington, DC, visited Ben Remington.

Pacific Environmental Group

October 15 - John J. Carey, Director of the NOAA Office of Budget and Finance, visited the Pacific Environmental Group.

10-12 - Reuben Lasker, SWFC, visited PEG and discussed the Sardine Anchovy Recruitment Program project.

Tiburon Laboratory

October 4 - Morgan Griffiths, San Francisco State University, and Engineering Consultant Raymond Yusi met with Norman Abramson to discuss the effects of the University's planned removal of the north docks.

10 - Charles Carey, NOAA Office of Budget and Finance, and Charles Fullerton, Director, Southwest Region, met with Norman Abramson to discuss Tiburon Laboratory and NMFS activities in California.

11 - Xavier Chavez and Robert Trotter, engineers from WASC, Seattle, Washington, surveyed the dock to prepare demolition specifications.

15 - Kiyoshi Nakajima, Taiyo Fishery Company, Eureka, California, met with Sus Kato to discuss quality of Dover sole flesh.

24 - Kristine Hagemeyer, Norgaard Consultants, San Francisco, California, met with Sus Kato to discuss several fisheries projects.

25 - Alan Davidson, Oxford University, met with Sus Kato to discuss Davidson's planned trip to Japan to gather information for his upcoming book.

31 - Don Ransom, Graphic Reproductions, San Francisco, met with Sus Kato to deliver samples of his company's products.

Meetings and Travel

Honolulu Laboratory

October 1 - Laboratory Director Richard S. Shomura met with Dr. Philip Helfrich and Wayne Baldwin, University of Hawaii, Henry Sakuda, Hawaii Division of Aquatic Resources, and Dr. Leighton Taylor, Waikiki Aquarium, at the UH Marine Science Building to discuss mahimahi research.

12 - Dr. Boehlert represented Richard Shomura at the Sea Grant Advisory Council meeting in the conference room.

23-25 - David Hamm participated in a meeting of the National Data Management Committee and a NMFS Economics Data Workshop at the Southeast Fisheries Center's Miami Laboratory.

La Jolla Laboratory

September 30- October 5 - Izadore Barrett traveled to Williamsburg, Virginia, to attend the Department of Commerce Executive Forum.

October 2-4 - James Thrailkill and William Flerx went to Seattle, Washington, to inspect the R/V MacArthur.

2-5 - Dan Huppert, Cynthia Thomson, and Dale Squires traveled to Catalina Island, California, to participate in Groundfish Economics discussion and annual workshop of Western Association for the Valuation of Ecosystems.

3-5 - Sam Herrick traveled to Catalina Island, California, to attend Western Association for the Valuation of Ecosystems Meeting.

14-24 - Rennie Holt participated in an International Whaling Commission planning meeting in Tokyo, Japan.

19 - Dan Huppert met with the Scientific and Statistical Committee's subcommittee.

October-November 22-2 - Jean Michalski traveled to Fort Collins, Colorado, for editorial training.

October 23-27 - Michael Laurs traveled to Seattle, Washington, to participate in the 31st Eastern Pacific Oceanic Conference and Seminar.

24-25 - Izadore Barrett attended a Fish Oil Symposium in Seattle, Washington.

October-November 27-7 - Izadore Barrett, Norman Bartoo, and Pierre Kleiber traveled to Las Palmas, Canary Islands, Spain, to attend the ICCAT and SCRS meetings.

October-November 27-14 - Gary Sakagawa attended the SCRS and ICCAT meetings in Las Palmas, Canary Islands, Spain.

October 29 - Fred Kellenberger met with Southwest Region staff at Terminal Island, California.

30-31 - Tim Smith traveled to Providence, Rhode Island, to attend an Antarctic research planning meeting.

October-November 29-1 - Ken Bliss, John Butler, Paul Fiedler, Sharon Hamer, Sandra Hawes, John Hedgepeth, John Hunter, Reuben Lasker, Nancy Lo, Susan Longinotti, Mark Lowry, Ron Lynn, Beverly Macewicz, Robert Owen, Celeste Santos, and Betsy Stevens attended the annual CalCOFI Conference in Idyllwild, California.

October 30 - John Carr and David Au traveled to Idyllwild, California, to attend the CalCOFI Conference.

30-31 - Chuck Oliver traveled to Coronado Island and San Clemente Island to present a talk to island personnel on pinniped studies.

Pacific Environmental Group

October 4-5 - Doug McLain attended the workshop of Eastern North Pacific Ocean Monitoring at the Naval Postgraduate School.

October 29-November 1 - Andy Bakun, Dick Parrish, Dave Husby, Doug McLain, and Donna Mallicoate attended CalCOFI in Idyllwild, California.

Tiburon Laboratory

October 2 - Ed Ueber participated in the groundfish economics workshop at Avalon, Catalina Island.

3-5 - Ed Ueber presided over the 10th Conference of the Western Association for the Valuation of Ecosystems.

8-11 - Bill Lenarz traveled to Portland, Oregon, for two meetings of the Groundfish Management Team of the Pacific Fishery Management Council.

9 - Ed Ueber participated in the San Francisco Sea Grant Advisors Meeting in San Francisco, California.

9-12 - Sus Kato traveled to Monterey, and Los Angeles, California, to work on a project dealing with alternative uses of mackerel and shortbelly rockfish.

11 - Norman Abramson traveled to La Jolla, California, for a meeting with Director Barrett and planning officer David Mackett on groundfish research.

18-22 - Sus Kato traveled to Los Angeles and Santa Barbara, California, to participate in a conference sponsored by the American Institute of Wine and Food.

23 - Ed Ueber traveled to Terminal Island, California, to participate with Southwest Region and Center economists who are working on groundfish vessel costs.

27 - Ted Hobson, Tony Chess, and Dan Howard conducted their regular quarterly sampling of the nearshore environment in Mendocino.

Personnel

Honolulu Laboratory

October 1 - George W. Boehlert, Supervisory Fishery Biologist (Research) - Promotion.

- Wesley K. Higuchi, Mathematics Aid - Conversion to Excepted Temporary Appointment.

2 - Marlene W. Dung, Computer Clerk - Conversion to Excepted Temporary Appointment.

24 - Kathleen M. Repollo, Clerk-Typist - Part-Time Temporary Appointment (Stay-in-School Program).

28 - Wayde S. Higuchi, Computer Programmer - Part-Time Temporary Appointment.

- Robert B. Moffitt, Fishery Biologist - Reassignment of Duty Station.

- Nathaniel T. Shippen, Computer Programmer - Conversion to Temporary Appointment.

30 - Janet L. Pappas, Computer Programmer - Part-Time Temporary Appointment.

31 - Thomas S. Hida, Fishery Biologist (Research) - Voluntary Retirement.

La Jolla Laboratory

October 1 - Randall Rasmussen, Biological Technician - Entered on Duty.

- Robert Stephens, Biological Technician - Entered on Duty.

9 - Dianna Eades, Clerk-Typist - Entered on Duty.

23 - Gina Battiste, Biological Aid - Entered on Duty.

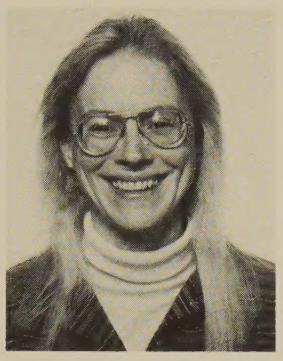
26 - Lee Innes-Brown, Biological Technician - Termination of Appointment.

- Michael Spruth, Electronic Technician - Resignation.

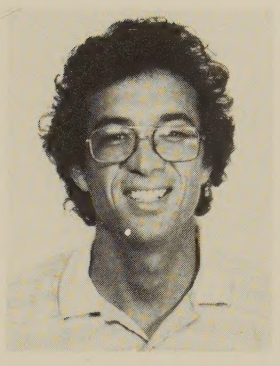
New employees at the Southwest Fisheries Center (in alphabetical order):

Randall Rasmussen
Biological Technician
Oceanic Division

Robert Stephens
Biological Technician
Oceanic Division



Elizabeth Vetter
Operations Research Analyst
Oceanic Division



Michael Walker
National Research Council Fellow
Oceanic Division

Tiburon Laboratory

October 2 - Wayne M. Samiere, Biological Aid - Extension of Appointment.

4 - Candis L. Cooperrider - Reassignment from Computer Programmer to Fishery Biologist (Research).

9 - Anne McBride, Biological Aid - Temporary Appointment.

Training

Tiburon Laboratory

October 28-31 - Maureen Woods, Librarian - Online '84, San Francisco, California.

UNITED STATES
DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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